

Remarks/Arguments

Election/Restriction

Applicants hereby affirm their provisional election to prosecute the invention of the Group II claims, claims 7-13 directed to the invention of a fiber mat with binder.

Amendments

Claim 7 has been amended to emphasize key aspects of the present invention. In particular, claim 7 has been amended to specify that claimed mat is a non-woven mat produced by the wet laid process by dewatering an aqueous slurry of fibers. Support for this amendment can be found, *inter alia*, in paragraphs [24]-[28] and [54]-[56]. Claim 7 also has been amended to clarify that the specified amount of protein is on the basis of UF and protein solids, consistent with the description in paragraph [47] of the application. A similar change was made in claim 11. No new matter is added.

The Invention

The present invention is based on the discovery that the addition of a small amount of a protein additive into a UF binder for making non-woven, wet-laid fiber mats, especially fiberglass mat, has a similar strength enhancing effect as the addition of a styrene-maleic anhydride (SMA) to such binders and that the additive combination of protein and SMA is particularly advantageous in such applications.

Response

Reconsideration and allowance are respectfully requested in light of the foregoing amendments and the following remarks. Applicants have amended the claims to expedite prosecution of the application. This amendment is not intended to acquiesce to the rejections raised by the Examiner and Applicants reserve the right to pursue broader claims in follow-on applications.

Claims 7-9 stand rejected as being anticipated by Belmares et al., USPub 2003/0099850 (Belmares). This rejection is respectfully traversed.

For any reference to serve as an anticipation of a claimed invention, the reference must teach each and every limitation of the claimed invention. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 58 USPQ2d 1286, 1291 (F ed. Cir. 2001).

Belmares describes including a polymeric polyamide scavenger comprising a formaldehyde reactive material into a coating formulation in order to reduce formaldehyde emissions. The sole purpose of the additive is to reduce formaldehyde emissions in panels and boards without significantly sacrificing strength, as occurs when using small molecule scavengers like urea.

The polyamide scavenger is a polymeric formaldehyde reactive material selected from synthetic or natural polyamides or combinations of the two. The synthetic polyamides may be selected from the group of polyacrylamides, polymethacrylamides, polyamide telomers, copolymers, terpolymers, tetrapolymers, and N-substituted polyamides. The natural polyamides include proteins, such as casein or soy protein. Belmares suggests that the formulation also can be used as a binder for composite panels. In the case of protein polyamide scavengers, Belmares indicates that the effective range of this material is from 5% to about 50%, from about 10% to about 40% and from 20% to 30% (Paragraph [0023]). Consistent with this teaching, in the illustrative examples, the polymeric additive, especially a protein additive, is used in an amount of 25% of the resin.

Belmares does not teach and does not even make it obvious to use what is a significantly lower amount of protein (0.1% to 10% in claim 7 and 0.2% to 7% in claim 11) embraced by the claims in a binder for a non-woven, wet laid fiber mat.

Wet laid fiber mats are structurally very different from the composite panels and boards embraced by Belmares. The panels and boards described by Belmares are prepared by consolidating the board ingredients under heat and considerable compaction pressure (though we note that Belmares' teachings regarding the formation of the boards and panels is sorely lacking). In contrast, the wet laid mats of the present invention are essentially un-compacted, relying mainly on the dewatering of a fiber slurry to cause mat formation.

The consolidation conditions used by Belmares thus create an environment where formaldehyde emissions become a significant concern. There is no indication that a formaldehyde emission problem of the type confronting the manufacture of such panels and boards is even a problem in the case of making non-woven, wet laid mats, or that use of urea would not be a sufficient solution to formaldehyde emissions in such

a circumstance. It is only the alleged failure of urea to solve the emission problem without sacrificing strength that prompted Belmares' use of polymeric scavengers. Absent such understanding by the prior art in the case of wet laid mats, there is no motivation to even consider the formulation used by Belmares in this significantly different application. A skilled worker simply would not find the teachings of the Belmares patent publication in composite panels analogous to the very different wet laid mat technology to which the pending claims are directed.

Claims 10-12 stand rejected under 35 USC 103(a) as being obvious over Belmares in view of WO 01/59026 to Trocino (Trocino). This rejection is respectfully traversed.

Belmares has been discussed above and no further discussion is needed.

Trocino describes making a protein-based adhesive by functionalizing a denatured (hydrolyzed) vegetable protein with methylol groups (e.g., treat the protein with formaldehyde), and then reacting the functionalized protein with a co-monomer having methylol groups (e.g., dimethylolurea or dimethylolphenol). Like Belmares, Trocino uses the adhesive in the formation of composite boards, unlike Belmares, Trocino uses the functionalized soy component as the major constituent of the binder (in the examples the soy protein was 50% or more of the adhesive solids – this is far removed from the upper limit of 10% embraced by the pending claims).

We submit that the rejection fails to provide an appropriate basis for combining these references. In Belmares, the protein is added solely as a formaldehyde scavenger. In Trocino, the protein is the main structural constituent of the adhesive formulation. A skilled worker would not consider the teachings of Trocino in connection with Belmares. The only similarity between the two is that they both relate to the making of composite boards. However, this similarity constitutes one of the main distinctions between these references and the pending claims. As noted above, a skilled worker would not consider teachings directed to composite wood panels and boards to have any relevance for non-woven, wet laid fiber mats. Trocino also is a non-analogous reference.

Claim 13 stands rejected under 35 USC 103(a) as being obvious over Belmares in view of Trocino and further in view of WO 98/34885 to Chang et al., (Chang). This rejection is respectfully traversed.

Both Belmares and Trocino have been discussed. Only through a hindsight consideration of the invention would one even consider combining the teachings of Chang with Belmares and Trocine. Unlike both Belmares and Trocino, Chang is directed to the preparation of non-woven wet-laid fiber mats. Chang, however, says nothing about protein and has no teaching that would in any way suggest that the addition of a protein to a non-woven, wet-laid fiber mat binder would provide any benefit whatsoever.

Claim 7 stands rejected under 35 USC 102(b) as being anticipated by Tinkelenberg, EP 0013447 (Tinkelenberg). This rejection is respectfully traversed.

As noted above, for any reference to serve as an anticipation of a claimed invention, the reference must teach each and every limitation of the claimed invention. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 58 USPQ2d 1286, 1291 (F ed. Cir. 2001).

As with both Belmares and Trocino above, Tinkelenberg is directed to a composite board (chipboard) (see Example 1 where the heating and compression parameters are identified). For reasons discussed above, use of a protein in an adhesive binder in such an application does not either anticipate, nor make obvious, the use of a minor amount of protein in a fiber mat binder that has been found to be desirable in preparing non-woven, wet-laid fiber mats in accordance with the present invention.

Claims 7-9 stand rejected under 35 USC 102(b) as being anticipated by Tang et al., EP 1176174 (Tang). This rejection is respectfully traversed.

Again, for any reference to serve as an anticipation of a claimed invention, the reference must teach each and every limitation of the claimed invention. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 58 USPQ2d 1286, 1291 (F ed. Cir. 2001).

Tang is directed to making disposable food and beverage containers that are biodegradable. The material comprises a combination of 30-90 wt% plant fiber and 10-60 wt% of an adhesive comprising a modified UF resin and a water soluble macro-molecular material. While the water soluble macro-molecular material may be a plant glue, it need not be and both starches and synthetic resins also are contemplated.

Nothing described by Tang anticipates, or even suggests the non-woven, wet-laid fiber mat of the present invention.

On the basis of the foregoing, the rejections of the claims 35 U.S.C. §§102(b) and 103(a) are improper and the rejections should be withdrawn. Reconsideration and the allowance of the pending claims are thus respectfully requested.

Respectfully submitted,

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